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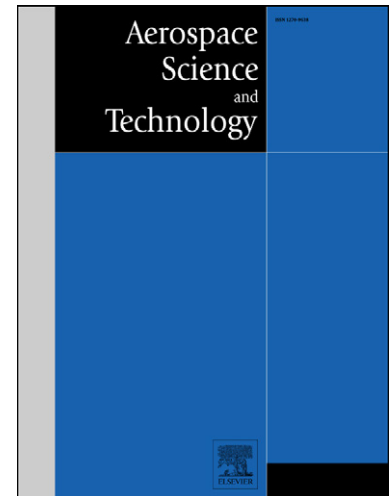
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# Design of a hybrid carbon fibre/carbon nanotube composite for enhanced lightning strike resistance

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## Abstract

This work presents a set of analytical design models to predict the electrical and mechanical properties of hybrid carbon nanotubes (CNT)/carbon-fibre (CF)/epoxy composites for potential use in fuselage and airframe constructions against lightning strike. The models are validated by experimental data from open literature. An optimization process is carried out to identify the microstructural configuration of the composite that provides the highest improvement in terms of electrical conductivity for the lowest structural weight in a CFRP fuselage design. The through-the-thickness conductivity of the composite laminate is considerably enhanced by a 2% volume fraction dispersion of CNTs within the matrix resin. The increase in the dielectric properties is accompanied by a moderate improvement of the composite mechanical performance. The hybrid CFRP/CNT composite configuration leads to a weight-efficient design solution for representative fuselage structures.

**Keywords:** lightning strike protection, carbon fibre composite, carbon nanotube, fuselage panel, design, optimisation

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